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An experiment on the effect of sodium bicarbonate and of intarvin on the excretion of acetone.

By ROGER S. HUBBARD and FLOYD R. WRIGHT.

[*From the Clifton Springs Sanitarium and Clinic, Clifton Springs, N. Y.*]

Haldane[1] has shown that if large doses of sodium bicarbonate (0.6 gm. per kg. body weight) are fed to normal subjects receiving normal diets the metabolism of glucose is depressed and acetone bodies appear in the urine. An experiment was planned to determine whether an increased excretion of acetone could be induced by moderate doses of the alkali in an arthritic subject who was receiving a diet which furnished sufficient calories for her needs (the patient gained in weight during the period of study) but which contained such small amounts of carbohydrate as just to prevent any significant ketosis. A markedly increased excretion of acetone was induced by 1.3 gms. (20 grains) of sodium bicarbonate fed in three equal doses after each meal. The increased excretion lasted as long as the drug was continued (August 11 to 18). The diet was approximately constant throughout the experiment except on the 17th and 18th of August, when the carbohydrate was somewhat decreased through an error. After this experiment part of the fat in the diet was replaced by a synthetic fat containing fatty acids with an odd number of carbon atoms (intarvin). A reduction in the amount of acetone excreted was found on the 22nd and the 23rd, as would be expected from the work of Kahn.[2] The carbohydrate content of the diet was then slightly decreased, and again intarvin was substituted for part of the fat (August 28) and an even greater decrease in the excretion of acetone than before was found. In this experiment on a subject maintained at the borderline of ketosis therapeutic doses of sodium bicarbonate caused an increased, and the synthetic fat intarvin a decreased excretion of acetone.

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[1] Haldane, J. B. S., Influence of hydrogen ion concentration-changes on human metabolism. Abstracts of Communications to the XIth International Physiological Congress held at Edinborough July 23-27, 1923.

[2] Kahn, M., Odd carbon atom fats in the treatment of diabetic ketosis. *Am. J. Med Sci*, 1923, clxvi, 826.

Date	Protein	Fat	Carbohydrate	Per cent of calories as carbohydrate	Sodium bicarbonate	Volume	Acetone bodies as acetone		
							Preformed plus acetoacetic acid	B-hydroxy butyric acid	Total
1924.	gm.	gm.	gm.	Per cent	gm.	cc.	mg./100 cc.	mg./100 cc.	gm.
Aug. 6	54	170	54	12	0.0	2720	0.0	0.0	0.000
" 7	54	170	55	12	0.0	1080	0.7	1.0	0.018
" 8	54	169	55	12	0.0	2520	0.7	0.7	0.036
" 9	56	170	53	12	0.0	1820	0.5	0.0	0.009
" 10	55	169	54	12	0.0	2320	0.7	0.4	0.017
" 11	56	168	54	12	0.0	1540	6.0	6.9	0.198
" 12	54	170	54	12	1.3	3140	3.2	7.4	0.332
" 13	55	169	56	12	1.3	2540	4.2	3.7	0.201
" 14	55	171	54	12	1.3	2310	8.0	14.5	0.520
" 15	56	171	54	12	1.3	2060	14.6	18.0	0.667
" 16	57	170	54	12	1.3	1960	6.8	11.6	0.361
" 17	54	175	46	10	1.3	1820	10.3	11.9	0.405
" 18	54	175	44	10	1.3	2400	6.0	4.7	0.257
" 19	55	170	54	12	0.0	2500	5.7	5.3	0.275
" 20	55	172	55	12	0.0	1720	3.4	2.2	0.096
" 21	53	171	55	12	0.0	2070	2.8	3.1	0.122
" 22	54	168*	55	12	0.0	2110	1.6	1.2	0.059
" 23	55	170*	56	12	0.0	1690	2.1	1.1	0.054
" 24	54	170	54	12	0.0	1160	8.5	12.4	0.243
" 25	56	171	56	12	0.0	1790	3.5	2.2	0.102
" 26	54	175	46	10	0.0	2580	3.0	2.8	0.149
" 27	54	175	45	10	0.0	1980	4.0	5.3	0.184
" 28	55	175*	46	10	0.0	2400	0.7	0.4	0.027
" 29	55	174	44	10	0.0	1980	2.7	2.4	0.103
" 30	54	175	46	10	0.0	1340	3.7	5.7	0.107
" 31	55	169	55	12	0.0	1370	2.4	1.8	0.059

* On these days 60 grams of intarvin was substituted for an equal amount of fat.